



Preface

The Sun, the astronomical object most significant to humanity, affects the entire geospace region. Because of the consequences to Earth of the Sun's dynamic behavior and the rapidly expanding utilization of this region for human activities, a thorough understanding of the Sun's effects is becoming increasingly essential.

The Sun radiates energy both as electromagnetic energy and as fast-moving, electrically charged particles. The electromagnetic radiation across a broad spectrum of wavelengths originates from the photosphere, the Sun's surface. This energy proceeds unimpeded directly from the Sun to the Earth's atmosphere, with a majority reaching the surface of the Earth. Very small variations in this energy flow have considerable consequences to the climate of Earth.

The streaming of electrically-charged particles away from the Sun results from the energizing of gases in the solar corona. This continuous, but highly variable stream, called the solar wind, has speeds of up to 1000 km per second. Its variability is closely connected to events on the Sun and in its corona. In contrast to electromagnetic radiation, the transit of energy in this form through space is very complex, especially as it interacts with magnetospheres and atmospheres to produce a wide variety of phenomena and consequences. The most striking manifestation of this interaction is the display of auroras in the northern and southern polar regions of Earth.

The LWS program will permit comprehensive study of the cause-and-effect relationships between events at the Sun and their effects in geospace that influence life on Earth and humanity's technological systems.



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